WG-3-3:	Forestry-Conservation
WG-3-4:	General Government
WG-3-5:	Highways (including Intelligent Transportation System)
WG-3-6:	Infra-structure
WG-3-7:	Criminal Justice
WG-3-8:	Public Transportation
WG-3-9:	Public Service
WG-3-10:	Federal Government

12.3.4.2 Methodology

The co-chairs of each of the subgroups began a series of weekly meetings by telephone conference call or in person at the scheduled meetings of the Interoperability Subcommittee.

The co-chairs of the subgroups selected a series of major incidents occurring in the United States during the past 14 years which involved the use of inter-operability. Each of the ten subgroups was tasked with the collection of information on these incidents as follows:

WG-3-1	Fire/EMS: Oakland Hills & Old Topanga (Los Angeles) Fires (populated areas)
WG-3-2	Emergency Management: Loma Prieta & Northridge Earthquakes, PA Flood
WG-3-3	Forestry-Conservation; Yellowstone Fire (unpopulated area)
WG-3-4	General Government: Assist WG-3-1 & WG-3-2
WG-3-5	Highways: Assist WG-3-8 & WG-3-9
WG-3-6	Infrastructure: Assist WG-3-2
WG-3-7	Criminal Justice: LA Riots, OK City/World Trade Center Bombings
WG-3-8	Public Transportation: DC/NJ Train Collisions
WG-3-9	Public Service San Bernardino Train Derailment & Haz Mat Release
WG-3-10	Fed Gov: Air Florida Crash in DC, Political Conventions

Prior to the ISC meeting on February 29, 1996 in Orlando, Florida, a draft Data Collection Instrument (DCI) was prepared to standardize the gathering of information on the major incidents by members of the WG-3 subgroups. This instrument was approved at Orlando with one minor modification. It was subsequently used for all data collection. The completed DCIs are available for review, upon request.

Simultaneous with the collection of data by the WG-3 subgroups, Motorola began to interview a number of the key persons involved in several of the more recent incidents. The purpose of these interviews was to capture a clear picture of the incidents in the words of the participants and to gather insight into interoperability problems, particularly with respect to issues of command and control. Motorola's report is included as Attachment 5 in this report.

Finally, using all of the above information, this report was prepared and circulated for comment. The first draft was circulated prior to the April 12, 1996 meeting in San Diego, CA.

12.3.5 Types of Interoperability

12.3.5.1 Day-to-Day

- the most often encountered type of interoperability. It is commonly used in areas of concurrent jurisdiction and is usually tactical in nature.

- Interagency interoperability is a form of day-to-day interoperability that requires users from different agencies which do not share a common communications system to be able to communicate

- typically is used:

  - where agencies need to monitor each other's routine traffic, and

  - where units from two or more different agencies need to interact with one another and to exchange information

  - often involves different public safety disciplines responding to the same incident.

  - minimizes the need for dispatcher-to-dispatcher interaction in the exchange of information among field units.

    In addition to the time delay involved in establishing a communications path between dispatch centers and the time required to physically restate information, it is a known fact that the more times a message is repeated from one party to another, the more prone it is to having error introduced into its content. This is critical for tactical field situations.

    There may be events where dispatcher intervention or monitoring of information is appropriate for resource management, administrative command/control, etc. This is especially true when command-level information is being passed between agencies.

- if agencies are on different bands, day-to-day interoperability may involve the use of multiple radios in each vehicle.

- difficult to implement for field personnel using portable radios unless all equipment operates on the same band and within the same type of infrastructure.

12.3.5.2 Mutual Aid

- Can involve many agencies with little opportunity for prior detailed planning (riots or wildland fires).

- Often requires assignment of several to many small groups, each on its own talkgroup or frequency (tactical communications).

- Once on scene, generally involves use of portable radios.

- Many incidents are in rural areas out of infrastructure range.

12.3.5.3 Task Force

- usually involves several layers of government (Federal, State and/or local)

- typically opportunity for prior planning usually is present.

- usually involves use of portable and/or covert equipment.

- often requires extensive close-range communications.

- radio traffic is such that wide area transmission is usually undesirable.

- users may rove in and out of infrastructure coverage (metro to rural, in and out of buildings, etc.).

- often implemented by exchanging equipment such that all users have identical or compatible equipment.

12.3.6 Selected Major Incidents Requiring Interoperability

12.3.6.1 Oakland Hills

The Oakland Hills Fire which occurred in the metropolitan Berkeley/Oakland, California area beginning on Oct. 20, 1991 represents the ultimate test - and importance - of interoperability. A once-in-a-lifetime experience for most participants, this wildland and structure conflagration resulted in the loss of 25 human lives and 3,354 private residences. Dollar loss exceeded $1 billion.

The progress of the Oakland Hills Fire and its overwhelming growth can be measured in the times of successive alarms: the First went out at 10:58 a.m., the Sixth (highest in the system) was called at 11:26 a.m., less than a half hour later.

Before all was over, aid arrived in Oakland from no fewer than 9 cities, 32 counties (115 mutual aid fire departments), 6 State agencies and 4 Federal agencies.

The following are quotes from the 1992-93 Alameda County Grand Jury report following their detailed investigation into the Oakland Hills Fire:

"The Oakland Fire Department Dispatch Center had two frequencies on which they could communicate with Oakland's 35 companies and several fire departments could communicate on a State-wide fire mutual aid frequency." [154.280 MHZ known as "Fire White 1" in California is authorized for base and mobile use and is the channel referenced by the Grand Jury; 154.265 and 154.295 MHZ are also known as "Fire White 2" and "Fire White 3" and are restricted to mobile and portable use only. These three frequencies are reserved nationwide for Fire Intersystem Operation by FCC Rules Section 90.21(c)(2).]

At the height of the fire, all radio communication was "almost hopelessly jammed."

The following are quotes from the California Department of Forestry's Fire Management Team's Incident Commander assigned to the Incident Command System's (ICS) Unified Command Post at the Oakland Hills Fire:

The basic problem was the large influx of mutual aid resources, 400+ engines through the [California Governor's Office of Emergency Services] OES system. With only [3] mutual aid (White) channels, we ran out very quickly. Likewise, many of the resources came in without multi-channel capabilities."

"Communications with cooperating agencies (PD, CHP, public works, etc) was limited to whatever communications were available within the com vans in base camp [setup in the middle of State Route 24 west of the fire]. Very little communications went from fire resources to other agencies other than face-to-face.

12.3.6.2 Old Topanga (Los Angeles County, CA) Fire

The Old Topanga Incident most likely represents the largest deployment of fire fighting resources in California's history. It is best described as a wildland-urban interface fire. The Incident spanned 10 days beginning on November 2, 1993. During that time frame, over 7,000 fire fighters from 458 separate agencies participated in the effort. The incident was managed via a fully developed Incident Command System (ICS).

During the Old Topanga Fire, the County of Los Angeles Fire Department and assisting/ coordinating agencies were charged with protecting the lives of thousands of citizens and more than 22,000 structures; 3,634 structures were directly exposed to the fire and 18,870 more were threatened had the spread not been contained. The fire consumed 16,516 acres within a 48-mile perimeter. At the point of full development, the ICS operations Section encompassed 5 geographic branches and an air operations branch. These branches were supported by 16 divisions with over 1,000 separate fire companies.

The Old Topanga ICS was responsible for information management that dealt with 165 engine strike teams (generally consisting of 5 engines each), 10 single engine resources, 129 hand crews, 31 fixed-wing aircraft, 23 helicopters, 13 dozers, 50 water tenders, 11 fuel tenders, 8 food dispensers and thousands of fire fighters and support personnel. Interagency coordination was required for hundreds of resources from 12 different sates and 458 agencies.

The Old Topanga Incident resulted in the loss of 3 human lives and injuries to 21 others. The reported number of injuries to fire fighting personnel was 565. Property losses were estimated at $10.8 million from damage to utilities, $208 million due to damage or destruction of 460 structures and their contents, $68 million due to hazardous waste control and the process of reseeding to prevent soil erosion was estimated at $0.44 million.

The Rand Corporation Report, PM-309-LACFD, issued in Sept. 94 discussed both the Oakland Hills and Old Topanga Incidents. The following are quotes from that report:

> "The lack of communication had several effects. It (1) caused inefficient operations; (2) interfered with command and control; (3) contributed to endangerment of fire fighters; and (4) may have contributed to losses."

> "Valuable resources were used purely for communications. Examples include that LAFD sent an extra strike team to check on the safety of Strike Team 1064 in La Costa; LAFD kept command resources on top of Old Topanga strictly for communications; several resources were used purely as messengers throughout the fire."

> "In the initial dispatch, strike teams were told not to use the radio, due to overload, but to go to staging area for face-to-face assignment. Some may have passed their assignments on the way."

> "Lack of communications probably contributes to endangerment of fire fighters in at least 3 incidents where engines were cut off from any communications with command. Requests for water drops probably went unheard...in some cases they were heard, but communications were intermittent and it was impossible to establish their location. Strike Team 1204A decided not to move from its positions because it did not know where to go or the condition of the roads and several fire fighters were subsequently injured."

> "...incident commands frequently could not rely on radio contact to position units or to warn them of changes in fire conditions. In addition, the communications system was badly overloaded in all the fires. With involved personnel trying to transmit messages over two or three channels, fire fighters could not get through to incident commanders to advise locations or confirm assignments. Aerial spotters and forward observers on the ground had difficulty sending important tactical input to incident command. Incompatible systems also hampered communications between fire departments and other public agencies. Overall, communications technology shortfalls meant that prescribed command and control systems operated at less than peak efficiency and effectiveness."

> "Just as the Oakland Fire sent lessons to the fire officers who would lead the fire fight at the Old Topanga Incident, the [Old Topanga} incident should send lessons to future incident commanders. We judge that a major lesson is that the time has come to update communications and information systems so that they provide more effective

support to the fire fighters who will be on the front line of future fires at the wildland-urban interface. The last five years have seen enormous advances in computers, communications systems, surveillance and detection systems, and the availability of GPS receivers for civilian purposes. These technologies can be combined into an effective command and control system to provide the next Incident Commander with the ability to greatly increase both effectiveness of wildland fire fighting and the safety of fire fighters.

12.3.6.3 Loma Prieta Earthquake

On October 17, 1989, at 5:04 p.m. (PDT), a M6.9 earthquake centered under Mount Loma Prieta in Santa Cruz County, CA (60 miles southeast of San Francisco) shook a 400,000 square mile area of the western United States. Major aftershocks continued for weeks. There were 62 deaths as a result of the earthquake, and more than 3,750 injuries. More than 22,000 residential and 2,000 commercial/public-owned structures were impacted, resulting in more than 12,000 people left homeless. Physical damage estimates exceeded $7 billion, including more than $1 billion in damage to the Interstate Highway System. Ten contiguous counties in the San Francisco Bay and Monterey Bay regions and two cities in the Sacramento - San Joaquin Delta region were included in the President's declaration of a Major Disaster area. Overall, State agencies and more than 100 County and City governments in the impacted area activated their Emergency Operations Centers (EOCs) and field forces.

Damage to utility lifeline systems was extensive in many areas while other areas experienced no damage. Firefighting water supplies were a problem in parts of Santa Cruz County and in San Francisco; either the distribution systems broke due to ground shift, or power to operate distribution pumps failed.

Electrical power was knocked out throughout much of the area for a number of hours as power generation plants shut down due to the shaking. These plants had to be assessed for damage prior to being restarted. The natural gas distribution system in many areas fractured, creating additional concerns about restoring electrical power in these areas; as a result power restoration was often delayed until the gas lines could be secured.

Telephone service throughout the region faired very well in general. Shaking in some Switching Offices exceeded design criteria, causing structural damage to the buildings, however the switches remained in service. The two major problems to the Public Switched Telephone Network (PSTN) were: (a) failure of back-up power systems in Central Offices, and (b) overload conditions caused by too many calls trying to be placed into Northern California. To maintain the health of the national long-distance network, carriers restricted calls into and between four Northern California Local Access Transport Areas (LATAs). These overload conditions in the PSTN continued for almost two weeks following the main quake.

Cellular telephone service in the region generally remained operational for calls between cell phones. Calls into and from the PSTN were hampered by congestion at the gateways, and by the problems in the PSTN.

The Loma Prieta Earthquake, while causing major damage, was not catastrophic. Damage in individual neighborhoods varied by type and age of building construction. Areas closer to the epicenter, or built on "fill" soils at the edge of San Francisco Bay were hardest hit. As a result, the emergency response was handled as a series of simultaneous local disasters, with State and Federal assistance initially being targeted to the hardest hit areas of the region.

Widespread severe damage (resulting in concentrated heavy rescue efforts) was limited to three areas -- Oakland (collapse of 1.5 miles of double-decked freeway, resulting in 42 deaths), San Francisco (numerous building collapses in areas susceptible to liquefaction of the ground), and Santa Cruz County (partial failure of buildings in a shopping mall). The response activities in these areas continued for up to four weeks.

Due to the high population density, public safety and governmental public service communications systems in the San Francisco Bay area tend to be built in a regional fashion, with individual dispatch channels and common countywide tactical operations frequencies. Most governmental agencies in California have built their radio facilities with earthquakes in mind, securing equipment to prevent it from moving or falling over due to the intense shaking ("non-structural" hazards) and providing redundant back-up power systems (batteries and an AC generator). From a technical standpoint, the public safety communications systems withstood the earthquake's wrath with only sporadic system outages. However, some State agency, county and city communications centers were knocked off the air due to structural damage to the facility or non-structural damage in the Communications Center (unsecured consoles falling over, etc).

Operationally, public safety radio systems throughout the 10-county area quickly overloaded under the strain of the numerous simultaneous incidents. Common channels (both regional and the State-wide Mutual Aid frequencies) in these areas became unusable as multiple adjoining agencies attempted to use their tactical frequencies.

Mutual Aid and disaster relief efforts were coordinated through the California Office of Emergency Services' Coastal Region EOC near Concord, CA. Communications with the impacted county emergency management agencies (particularly at the south end of the disaster zone) were hampered by the overload conditions on the Mutual Aid radio systems, and the restrictions in the PSTN. These problems were solved (in part) through the use of a network of Amateur Radio Service repeaters intertied by microwave in the 5.8 GHz Amateur band. This network remained in service throughout the entire two week recovery period and provided the only portable-to-portable communications throughout the impacted area.

It should be noted that commercial land mobile radio systems in the region suffered much more damage than the public safety systems, mostly due to a difference in radio site construction design. Many commercial "community" systems failed due to a lack of back-up power. Others suffered physical damage as base stations toppled under the shaking. At one major commercial mountaintop site the tower toppled, pulling numerous unsecured base stations towards the antenna cable feed through plate in one corner of the building before the cables broke under the strain. In some cases systems were overloaded with too many clients involved with response and recovery work in the same frequency pair (i.e. a number of ambulance companies, plumbing companies and general contractors sharing a single channel).

12.3.6.4 Northridge Earthquake

At 4:31 a.m. (PST) on January 17, 1994, millions of Southern California residents were rousted from bed as a M6.7 earthquake shook the region. Centered under the heavily populated Northridge community in Los Angeles, the earthquake was felt in many locations as far as 250 miles from the epicenter. 57 people died, and more than 9,000 were injured. Eleven freeway structures at 8 locations collapsed, cutting off 14 major thoroughfares. More than 3,000 aftershocks were recorded in the first few days after the main quake. Three counties (Los Angeles, Orange, and Ventura) were included in the President's declaration of a Major Disaster Area. Direct damage estimates have exceeded $20 billion. More than 215,000 people applied for Federal assistance in the first two weeks following the event.

Ground shaking in this earthquake was the highest recorded to date in California, with peak accelerations approaching 2x gravity. Damage to structures and utility lifelines was extensive in many areas of the City of Los Angeles and surrounding communities in a 45-mile radius of the epicenter. Out of 114,000 structures assessed for damage, approximately 14,500 buildings were declared unsafe to occupy.

Within hours of the first shock, the American Red Cross and the Salvation Army were opening shelters. Ultimately, 49 shelters were established, serving more than 22,000 homeless. Local jurisdictions and the California National Guard established tents and additional services that at one point sheltered an additional 20,000 individuals.

Electrical power was interrupted to approximately 2.5 million customers throughout Southern California. Impacts to the power grid were felt as far away as Idaho, where 150,000 customers were without power for 3 hours. Major components of the high voltage (>230,000 Volt) distribution grid located in the immediate area of the epicenter failed, however the majority of outages were caused by downed wires. Restoration of the distribution system was rapid, with the majority of customers back on within 12 hours, and more than 90% on-line within 24 hours. Virtually all of the distribution was restored within 72 hours. Individual reconnections to the distribution system continued for a number of days.

Telephone service in Southern California is provided by two local operating companies. As has been the case in almost every major incident in California in recent years, the earthquake and each major aftershock led to overload conditions in the PSTN, as phones were knocked off-hook or were picked up by anxious citizens attempting to make calls (peak call volume on January 17th was 225% of normal). Physical damage to telephone network switches themselves was minor (dislodged circuit cards, etc.) and quickly repaired. Like the electrical system, the majority of service outages were caused by breaks in the distribution system, typically involving a downed "drop" wire at the customer's premise.

General Telephone of California (GTE) provides service to almost 3.5 million customers in the greater Southern California area. GTE reported approximately 400,000 of their customers were affected by the quake for a short period of time. Two switching offices suffered structural damage. Primary and emergency power systems in one of these offices failed, leaving 25,000 customers without service for 10 1/2 hours.

Pacific Bell (PacBell) serves 3.8 million customers in the Los Angeles area. PacBell advised the State that less than 10% of their customers were directly impacted by the quake, most for only a brief period of time. The company had structural damage to 31 of its 78 switching offices in the service area, with severe damage to only 5 of these buildings. One switching office stopped providing service due to a failure of its emergency power; this office was back on-line within one hour. 30,000 customer connections were repaired in the week following the quake.

Cellular telephone service in the region generally remained intact, although there were outages due to damage or a loss of power at individual cell sites. Congestion in the interface to the PSTN was another problem for about 10 days. The two carriers provided approximately 4,000 loaner telephones to response and relief organizations, along with free service for a 90 day period.

Water systems were heavily damaged in the hardest hit areas. Forty above-ground water tanks had some failure. Sixteen fractures of major distribution lines were reported in the areas of ground deformation; repairs took up to two months.

Damage to the distribution systems caused drinking water supply lines in some communities to be out for up to four weeks. At one point, 72 tanker trucks were used to provide drinking water to these neighborhoods.

The overall response to the Northridge earthquake was very effective. Local officials quickly identified their problem locations and responded. The recent introduction to the area of 120 new UHF-TV frequency pairs greatly eased channel congestion for those agencies who have built new systems; even so, all public safety radio systems within the impacted area were overloaded.

The great majority of public safety radio systems remained intact. Some communications facilities in structures (e.g.: hospitals) suffered from structural and non-structural damage. Some single-site failures in multi-point systems happened due to loss of power or other non-structural damage. This is noteworthy, considering one mountain ridge north of the epicenter (Oat Mountain, home of numerous public safety and commercial land mobile radio systems) was reported by USGS to have shifted 5' north, 2' west, and grew 14" during the initial event.

Many commercial radio systems in the same area suffered a higher rate of failure. Unsecured radio racks in buildings and at remote sites shifted in the quake, taking the radios off the air as antenna lines snapped. The tower at one Oat Mountain remote radio site was damaged in the main quake, and toppled during a major aftershock.

The State of California pushed additional law, firefighting, and communications resources into the region in anticipation of need. Six of the eight California Urban Search and Rescue (USAR) task forces created following the Loma Prieta earthquake were sent into the area. Two additional Federal Emergency Management Agency (FEMA) USAR task forces were also moved into the area. Mutual Aid activities were coordinated through OES' Southern Regional EOC in Los Alamitos, near Long Beach.

Due to overload in the established radio systems, it was determined that additional radio systems would be necessary to coordinate the extensive response and recovery process. A 'Unified Communications Command' was developed between OES, the California Dept. of Forestry and Fire Protection (CDF), and the U.S. Forest Service (USFS) to coordinate communications augmentation. Systems were deployed using cached radio equipment from OES and CDF on state-wide frequencies, and equipment from USFS and the National Incident Radio Support Cache (NIRSC) operating on USFS and NIRSC frequencies in the 160-171 MHz and 406-420 MHz spectrum. In-state communications caches were staged at Los Alamitos within 18 hours of the initial event and NIRSC equipment was being deployed within 30 hours.

Four of the 56-member USAR task forces are based in the immediate area. Three task forces were able to use their home radio systems. The remaining three California task forces and the FEMA task forces shared NIRSC UHF Logistics frequencies for their tactical operations.

A network of 2 inter-connected repeaters on NIRSC VHF Command frequencies was built to provide safety communications for the teams of structural engineers providing initial damage assessment surveys, and joint teams of geologists assessing the effects of the event.

A NIRSC UHF network was deployed to handle the coordination between the state's Constitutional Officers and other executives, relieving this load from a statewide law enforcement frequency overloaded with operational traffic. While operating without encryption, an additional benefit was a level of communications security provided by not operating in "normal" public safety spectrum.

One of the three OES statewide Mutual Aid radio networks was used to coordinate make safe operations (removal of damaged chimneys and property walls) of the California Conservation Corps. An additional (portable) repeater was deployed to enhance coverage. This repeater was placed on a mountaintop providing coverage of the impacted area. Because a 4-wheel drive vehicle was not available immediately, this repeater could not be deployed for 4 days.

One of CDF's statewide networks was used to handle the coordination of the delivery of drinking water, including water tanker dispatch operations. This network was also used to coordinate the logistical needs of the government-provided shelter operations. Additional repeaters were deployed to provide coverage in populated canyons.

More than 6,000 mobile homes were knocked off their foundations and damaged. FEMA and the CA Department of Housing & Community Development provided funds to make minimal repairs and place these units on seismic foundations. Program administration and inspection of this 10-month program was accomplished using commercial land mobile radio systems and cellular telephones.

12.3.6.5 Los Angeles Riots

A major urban Civil Disturbance began in the Los Angeles basin on April 1992 after four Los Angeles Police Officers were found Not Guilty by a State court for the alleged beating of Rodney King. This disturbance lasted for a period of 5 days during which time thousands of mutual aid police officers from throughout California, the California National Guard, and federal troops were deployed throughout the area.

In response to the urban violence is the greater Los Angeles area, nearly every police department in Los Angeles County, as well as many in neighboring counties, fully mobilized in order to coordinate personnel and resources. The County's Chief Administrative Officer declared a countywide State of Emergency. Court orders were prepared restricting the sale of gasoline and ammunition in the affected riot areas and a dusk to dawn curfew was established. Major city and county governmental facilities such as City Hall, the County Criminal Court Building, and the Sheriff's Department Headquarters were attacked by rioters. Los Angeles Area light rail transportation systems were shut down and the air traffic pattern at Los Angeles International Airport was altered to minimize exposure of aircraft to sniper fire. Major rioting erupted throughout the County jail system in reaction to rioting in the streets. As a result of the mass number of riot arrests, the LA County Presiding Judge relaxed normal court arraignment procedures.

Governor Wilson mobilized the California National Guard and the California Highway Patrol (CHP) within 24 hours of the start of rioting to assist local law enforcement. Approximately 3100 CHP officers were assigned to the incident over a 5 day period. Because fire personnel were being attacked as they responded to fire & EMS calls, the CHP was asked to provide security for fire personnel and their facilities. The CHP responded to an average of 250 emergency calls per hour during the 5 day period with a total of 6,000 emergency escort missions.

President Bush nationalized and augmented the nearly 7,000 national guardsmen already deployed with federal troops. Public transportation was used extensively to carry national guard & mutual aid law enforcement personnel to various sites in area..

By May 6, 1992, a total of 14,615 riot related arrests had been made and 58 deaths reported. Several hundred buildings were destroyed by fire. Property loss due to arson and looting reached one billion dollars.

12.3.6.6 District of Columbia Metropolitan Area Transit Authority (WMATA) Train Derailment

On January 13, 1982, A WMATA passenger train derailed. While this incident, in itself, was a serious accident affecting public safety it occurred during two other major incidents in the DC area: a crash of an Air Florida jet in the Potomac River and an area paralyzing snow storm. The concurrent multiple disasters endangered the public safety of the region. It is being included in this report because it highlights the confusion that can result without interoperability among local, regional, state, and federal agencies. Interoperability is critical to effective handling of these or similar situations.

The Washington D.C. metropolitan area was being hit with a major snowstorm which had yielded approximately six (6) inches of accumulation in a short period of time. During the day, as the storm worsened, plans were made for the early release of workers throughout the area so that homeward travel could commence before the height of the snowstorm.

At 2:00 P.M., the area's largest employer, the federal government, released a majority of its workforce. Driving conditions had become difficult making traffic flow minimal and creating extreme congestion. Gridlock conditions occurred throughout the entire area. The snowstorm was at its peak by 3:00 P.M. and many commuters in vehicles had come to a complete stop on roadways due to the adverse conditions.

Many commuters used the WMATA subway system as a means to complete their trip home. The WMATA system was carrying peak hour passenger loads due to the mass exodus of employees who decided to take mass transportation home.

At approximately 3:45 P.M., Air Florida Flight 90 crashed on the Fourteenth Street bridge and created a multi-sector and multi-agency response condition. This, coupled with the weather, created massive traffic congestion which further complicated matters (see Section 11.3.4.13 for the description of this incident.)

During the height of the Air Florida river rescue efforts, a WMATA subway train, transporting peak hour passenger loads, derailed in the tunnel between the Federal Triangle and Smithsonian Stations.

The accident occurred when a train, eastbound toward the Smithsonian Station, entered a crossover switch and moved onto the westbound track. This unexpected crossover was immediately recognized by the WMATA operating personnel on the scene, and the train was stopped. An attempt was made to reverse the train's direction to pull it back onto the eastbound track. At that time, the front wheels of the lead railcar pulled back into a concrete bulkhead, straddling both tracks, cutting off service between McPherson Square and Federal Center S.W. There were three (3) fatalities, at least twenty-five (25) passengers injured, the railcar severely damaged, and thousands of other commuters in trains following behind this one were affected.

The first report of the derailment was received from a WMATA employee, a Transit Patrolman, riding in the lead car of the train. He contacted Metro police communications via his portable radio advising of the accident with injuries to passengers and the fact that special equipment was needed to perform the rescue efforts. The damage to the train resulted in the loss of both power to the tunnel area and on-board emergency battery electrical power, thus, disabling the public address system and normal lighting. Rescue efforts would have to be conducted over a considerable distance in underground tunnels with limited access points.

Emergency responses to the Metro crash were made difficult by the extensive traffic congestion and the congestion cased by of large numbers of rescue equipment at the Air Florida crash site. Some equipment needed to be diverted from the Air Florida crash site to the Metro crash site located across town. Because of the lack of sufficient emergency aid responders and equipment, some necessary medical attention was given on the scene, extending the time from injury to arrival at area hospitals for definitive care. Time lapses in some of the Metro rescue activities were extensive due to the logistical problems the rescue presented.

Decision making for Metro rescue efforts were difficult because of the isolated location of the emergency. Since the location of the incident was between stations and because a substantial amount of sparking and smoke occurred in the area of the crash, evacuation of passengers was made more difficult. Within the damaged railcar, there was a failure of the emergency lighting. Outside the car, sparks were visible, even though power had been shut off.

Communications problems arose because of the difficulties in communicating via radio within the Metro system tunnels. Communications from the train had to be radioed to Metro Police Communications center and Metro Train Communications center and then telephoned to responding police and fire services. Since neither D.C. Police nor Fire Department radios could transmit from within the underground system, a similar lengthy sequence of relayed transmissions was necessary to effect communications from an inter-agency standpoint not to mention the intra-agency problems experienced.

Public awareness & notification difficulties existed. Passengers who were not in the damaged car were not notified of the scope of the emergency since the public address system was not functioning due to the power failures. Passenger fear was heightened by the lack of information as to what was happening around them and misconceptions of the power in the third rail.

General Summary of Metro type Incidents and the need for Interoperability.

- There is a need for implementation of an underground communication systems infrastructure that is capable of handling not only the communications of personnel normally engaged in operations of transit systems, their personnel and transit police forces, but also incoming personnel from police, fire, emergency medical and possibly public service sectors.

- Transit incidents consist of many complexities that can hamper routine rescue efforts. Transit personnel must be involved in supporting and providing information to responders that generally are unfamiliar with the environment of mass transit systems.

- Unfortunately, the conditions that existed at the time of the 1982 derailment continue to exist today - emergency first responders generally cannot communicate in underground subway facilities. There continues to be a lack of interoperability among emergency first responders and the providers of mass transportation services. Communications concerning an ongoing subway or mass transportation incident (including providing updates as conditions change) must be transmitted to a central communications command center for relay to emergency personnel on the scene.

12.3.6.7 New Jersey Train Collision

On February 9, 1996, at about 9:00 am, a collision between two commuter filled trains in-bound to their terminals occurred in a difficult to reach portion of track located in the marsh area of the New Jersey Meadowlands near Secacus, NJ, just west of the Hudson River and New York City.

Three fatalities were attributed to this collision, two transit personnel and one passenger. There were a number of critical or unstable victims requiring immediate medical care, in addition to a multitude of potentially unstable victims out of the 1200 passengers on both trains. An exact number of injuries is unavailable since there was poor interoperability communications among the diverse response agencies. The response agencies included: New Jersey Transit Railroad; New Jersey Transit Police; New Jersey State Police; Port Authority Police; ConRail Police; municipal, county, & local police; municipal & volunteer fire; and municipal and volunteer ambulance/First Aid & Rescue.

Basic communications for entities on their respective channels was a staple and interoperability was required to coordinate the response of emergency responders and transit personnel.

The passenger rail service on this portion of the New Jersey Transit Railroad operates in conjunction with other railroad entities. The tracks are a common highway for the massive heavy rail equipment in the area. Since very few properties are available for rail expansion in the major metropolitan areas, it is common practice to coordinate use of tracks for freight and hazardous materials, in addition to passengers. The incident required the cooperation of many entities as this was a mutual thoroughfare.

The initial call for assistance came from the train conductor on his portable radio. Just after the collision, the conductor assessed the scene and notified his dispatcher of the condition. This call for assistance was routed from the train dispatch center and given to the Transit Police and other railroad response departments. Minutes later, numerous calls to 9-1-1 were being received by the police from injured commuters aboard the trains via their cellular telephones.

The New Jersey Transit Police dispatched their field personnel and began emergency management procedures. A NJ Transit field command post was dispatched to the scene, local jurisdiction police, regional fire and EMS services were also notified.

Due to the difficulty in arriving at the scene and the lack of exact locations, the first to attend to crews and passengers were not police, fire, or EMS personnel but train crews (conductors & other train personnel in the area). The crash location vehicle access was through a dirt service road along side the track through a marsh. Communications were extremely important to determine the need for personnel at the scene. Unnecessary personnel or inappropriate equipment at the site would hamper scene operations and accessibility. Due to the lack of common interoperability channels, this service road became blocked with vehicles.

Transit personnel were called upon to remove uninjured passengers from the scene in addition to stabilizing the wreckage for other responders. Transit personnel created a medical transportation train that could transport the uninjured as well as the injured from the incident site. This train was staffed by transit personnel, police officers, fire personnel, EMTs and paramedics who began triage and medical treatment while enroute to an accessible treatment/ambulance transportation area away from the crash site.

Coordination of the transit agencies (rail, bus, and transit police) were handled by the NJ Transit Police through their on-scene command post. Transit and Transit Police agencies in the area are predominately on VHF high band frequencies and 800 MHz trunked systems.

Fire and EMS services had a mix of coordination since lack of common channels existed. Fire and EMS communications were localized and decentralized. Fire and EMS personnel use various frequencies from VHF low band through UHF & 800 MHz.

Transit personnel have incorporated a type of interoperability within their VHF radios by programming everyone else's frequencies into their radios and by having a separate link to an 800 MHz trunked mobile radio within their vehicle. The Transit Police can communicate with Police personnel from the adjacent Transit Police agencies (NYCPD's Transit Bureau, MTA-Metro North Commuter Rail Police, and ConRail - a freight carrier). NJ Transit Railroad personnel can be reached by the Transit Police through operational frequencies for trains, maintenance, and electrical distribution.

NJ Transit Bus, an operating department of NJ Transit, has a VHF linked frequency through an 800 MHz system talkgroup. The NJ State Police Emergency Network (SPEN) is used by a variety of public safety groups.

Although the NJ State Police operate on a statewide 800 MHz trunked system, some coordination within the state continues to occur on a set of four (4) VHF simplex frequencies designated as follows:

- SPEN (Statewide Police Emergency Network) 1 is used to coordinate emergency police activities.

- SPEN2 is the national police emergency channel used to coordinate with out of state and federal units also serving as a back-up for SPEN1.

- SPEN3 is a common frequency for police agencies for non-emergency communications.

- SPEN4 is a common frequency for all public safety agencies for tactical, routine and emergency use (any police, fire, EMS, HAZMAT, etc).

The NJ Transit Police Central Communications Center communicates through all of the above methods in addition to accessing the marine radio channels. Since portions of the track cross over navigable bodies of water, it is necessary to have access to US Coast Guard resources.

Communications interoperability for this incident was accomplished in an extremely decentralized fashion. NJ Transit, through its Police and Emergency management groups, coordinated all scene and rescue activities. When coordination of Fire or EMS resources was necessary, a Transit officer stopped a Fire or EMS person and told him to relay a message to his/her scene coordinator on their own frequency. The scene coordinator of New Jersey Transit did not fully control the efforts of fire suppression or medical care. Fortunately, the departments and responders on-scene performed their respective tasks with few difficulties since ultimately, each responder was at the mercy of the rescue train for transportation.

The focus of Transit workers was scene safety and management of its passengers. Transit workers stabilized the scene by supporting the locomotives, track, railcars, and ensuring electrical power and locomotive diesel fuel did not pose a hazard to passengers and rescuers. In addition, transit workers arranged and coordinated the evacuation and transportation of uninjured passengers through buses and a "rescue" train. Transit agency communications were well coordinated since NJ Transit police and personnel could communicate on their own frequencies. Police agencies utilized the SPEN channels while Fire and EMS only communicated with each of their respective departments. Except for those departments with access to VHF SPEN4, Fire and EMS had no interoperability with Transit personnel.

12.3.6.8 San Bernardino (CA) Train Derailment Hazardous Materials Release

A derailment of a freight train in the Cajon Pass, near San Bernardino, CA resulted in an explosion followed by flames and toxic fumes. The danger presented by the toxic fumes made it necessary to close a 15 mile section of Interstate 15. There were eight governmental agencies and three railroads involved in the incident.

The primary agency in charge was the California Department of Forestry and Fire Protection (CDF). They established an Incident Command (IC) post for coordination with other involved agencies.

The California Highway Patrol was called in to close Interstate 15 in the affected area. They were also involved in the evacuation process of motorists on the highway at the time of the incident..

The San Bernardino County Sheriff's Department was brought in for assistance with the closing of the Interstate as well as providing evacuation support for any residents in the area.

The California Department of Transportation and the San Bernardino County Roads Department coordinated the rerouting of the traffic around the incident.

The California Environmental Protection Agency was notified and they established monitoring posts to track the release of the toxic fumes into the air.

In conjunction with the California EPA, the United States EPA was involved in coordination efforts.

The monitoring posts for the California EPA were established and managed by the South Coast Air Quality Management District. They provided air sample information to the agencies involved in the incident.

There were three railroads involved with the incident. Santa Fe, Southern Pacific and Union Pacific share a common right-of-way through the Pass. The railroad special agents were utilized to coordinate containment and clean up efforts with the other agencies involved in the incident. The railroads also coordinated rerouting of train traffic to avoid the area.

The California Public Utilities Commission is responsible for investigation of all train derailments within the state.

<u>Communications summary of the current communications system.</u>

Cellular telephone service was available due to the proximity of the derailment to Interstate 15. However, the cellular system did not provide dispatch-type services, leaving it useful only for cell phone to cell phone and cell phone to public switched network use. Additionally, only a single, low capacity cell site served the incident area.

The agencies involved in this incident utilized the 30 to 50 MHz, 130 to 174 MHz, 800 to 900 MHz, and the 406 to 512 MHz bands. Typically, multiple radios were required in order to coordinate efforts at the scene.

<u>Recommendations for future communications.</u>

This incident could have been handled more efficiently if proper administrative procedures (pre-planned channels and telephone number lists, for example) had been established between participating agencies prior to the incident. For this area, the CALCORD network should have been the primary communications path. CALCORD is a simplex VHF system (156.075 MHz) licensed to the State of California for mobile and portable use only; all first responders and support agencies (including some private organizations such as utilities) operating on the VHF band are encouraged to place this channel in their radios. Unfortunately, few agencies had the capability of utilizing CALCORD or refused to use it for fear of losing contact with their field personnel.

A video surveillance system would have been extremely helpful for allowing experts not located at the scene to view the incident and to recommend procedures for the field personnel to follow.

Data communications would have been helpful to obtain the latest inventory and handling practices for the hazardous materials on the train.

Access to facsimile machines would have been helpful for transferring written information to and from the scene.

A remote control crawler/robot would have been useful for obtaining fire fighting and hazardous material information from the wreckage without endangering personnel.

12.3.6.9 Incidents Involving Public Service Providers

Public Service Providers such as the gas, water, and electrical utilities are involved with supporting public safety agencies on a regular basis. During the suppression and containment of fires, the utilities are called upon to disconnect services to structures in an effort to minimize additional problems related to electrical short circuits and gas line ruptures. Communications between the utility companies and the Public Safety agencies are typically done through the dispatchers.

Disaster assistance agencies such as the Red Cross provide a valuable support service to Public Safety agencies when disasters involve the public.

12.3.6.10 Alberton (MT) Train Derailment and Chlorine Spill

The Alberton hazardous materials incident is reported to be the second largest chlorine release in history and resulted in the longest interstate highway closure ever. The magnitude of the chlorine hazard was exceeded only by a catastrophic release some twenty years ago with few of the cleanup problems faced in Montana. From the derailment on April 11, 1996, 1000 residents were evacuated and 80 miles of highway were closed for 18 days. Over 300 responders from 21 separate agencies were involved in the emergency response and cleanup effort. Local, state, and federal (including military) resources were deployed. One death resulted and direct government costs exceeded $1 million. Total costs for all aspects are undetermined at this time, but are expected to be several times that figure.

The derailment occurred just inside rural Mineral County which borders the much more populous Missoula County. Among a number of hazardous material-bearing cars, four chlorine tankers at the center of the derailment proved to be the biggest problem. One was punctured and began venting during the accident, resulting in extremely lethal chlorine concentrations until emptied 18 days later. An immediate threat was posed to the town of Alberton (pop. 350), but of greater worry were larger towns along the dispersal path in Missoula County.

ICS with a unified command structure was employed immediately. Primary responsibility was given to Missoula County with its greater resources and better access to the site. A formal communications unit and trained leader were deployed within hours, serving until the last incident resources were released. Through most of the incident, four dispatch positions split between two field communications centers implemented a communications plan of a dozen formal frequencies (and several adopted ad hoc), 10 telephone lines, and 35 cellular phones. A communications technician and the unit leader rounded out regular staffing of six communications unit slots. All these were on-scene, incident resources and in addition to those used at the regular dispatch centers and EOCs.

Montana's extensive mutual aid radio plan was the basis for incident communications, with wide-area links provided by local agency mobile relays. A transportable, field-programmable remote base station served as the hub for the incident's critical evacuation net. This net was used to prompt emergency evacuation of all incident personnel when chlorine levels became too high, occasionally exceeding even that permissible with the most extensive personal protective gear. It was tested every two hours due to its importance.

Missoula is the site of two large state and federal wildland fire caches, so communications equipment suitable for interagency emergency deployment was plentiful and readily available. The National Incident Radio Support Cache in nearby Boise, ID, offered even greater numbers of identical kits if needed. In conjunction with a well-recognized mutual aid radio plan compatible with their technology, these interagency caches supported interoperability very well. Access to them and their field programmable radios is given key credit for communications successes during the incident. Incident command staff have concluded that communications problems during this incident were significantly less than previous ones and none were life-threatening.

12.3.6.11 Air Florida Crash

On January 13, 1982 at approximately 3:45 p.m, Air Florida Flight 90 took off from Washington National airport and moments later crashed into commuter traffic on the northbound span of the Fourteenth Street Bridge, which spans the Potomac River between Northern Virginia and Washington, DC. After striking the bridge, the 737 jetliner broke in two pieces and fell into the ice-covered Potomac River near the Virginia side and quickly sank below the icy surface.

This tragic occurrence instantaneously created a multi-sector emergency response encompassing two geographic areas, both requiring emergency rescue and medical services. Each site represented a different combination of equipment and personnel to be assembled from the resources available to the Federal, State and local agencies in the surrounding area.

A helicopter, boats, life rafts and divers were needed to attempt a rescue of the aircraft passengers and crew members in the Potomac River. Rescue workers equipped with tow trucks, hydraulic jacks, acetylene torches and related equipment were needed to rescue passengers from the crushed automobile wreckage on the bridge. Both sites needed emergency medical services to stabilize and transport the rescued to nearby hospitals. Both sites needed a law enforcement response to assist in rescue efforts and provide traffic and crowd control.

The two sector aircraft and motor vehicle rescue operation quickly escalated to a multiple incident rescue operation a half hour later when a Metro subway train derailed in an underground tunnel near the Smithsonian Station of the Metro subway rail system. Here, another group of rescue workers similar to those deployed on the bridge were needed to rescue passengers from the subway train wreckage.

To further complicate matters, massive traffic jams would impede the progress of the responding emergency personnel as they traveled toward the sites of the emergencies. The diminished road conditions coupled with the early release of Federal employees due to the day long snow storm produced traffic nightmares and gridlock throughout the area.

<u>Public Safety Notification and Response</u>

Public safety officials were notified of the air crash through two different means. The United States Park Police Communications Center received the initial call from a commuter on a mobile phone who advised that there was a plane crash in the Gravely Point area (just north of the airport) of the Virginia shoreline of the Potomac River. The Park Police Communications Center called the control tower at National Airport and the FAA advised that they had no knowledge of an airplane crash. The District of Columbia Fire Department received notification from a commuter calling through the IMTS mobile telephone operator. The IMTS mobile operator connected him directly to the DC Fire Communications Center. The majority of the public safety agencies received notification when the FAA at National Airport broadcast an alert on the Washington Area Warning and Alerting System (WAWAS), a wireline network connected to the public safety agencies in the region sponsored by the Federal Emergency Management Agency (FEMA).

The response included the following number and types of organizations:

- Five county/regional Fire/EMS agencies
- National Airport Fire Dept.
- Five state/local police agencies
- Two federal police agencies
- Two Department of Defense agencies (Army and Navy)

- Three transportation agencies (Coast Guard, FAA & Virginia DOT)

- RACES and Red Cross volunteer support agencies

A helicopter was provided by the U.S. Park Police. Divers from Fairfax County, Virginia, as well as the District of Columbia Police and U.S. Navy participated in the rescue effort, which basically turned into a recovery effort.

Three types of problems were encountered by responders

- **Situational problems:**

Multiple Incidents - The Metro subway train crash siphoned off personnel and communications resources.

Traffic Gridlock - Bad weather and heavy traffic from early release of Federal employees produced impeding traffic conditions.

Multiple Geographic Sectors - The fact that responders were needed on the bridge and at the riverbank divided available personnel and created an increase in communications traffic.

Notification Delay - The driving snowstorm produced very low visibility at the time of the incident. This limited the number of people who could have witnessed and reported the incident to those in very close proximity of the accident. Most witnesses were in their cars and unable to report since cellular telephone service had not been implemented yet.

- **Organizational problems:**

Lack of Command and Control - At the time of the Fourteenth Street Bridge disaster, there was not a formal Incident Command System (ICS) in place. Command and Control protocol was inadequate. Likewise, communications protocols and channel utilization procedures were inadequate.

Undetermined Controlling Jurisdiction - The fact that the incident involved both the bridge and the river made it difficult to determine jurisdictional authority.

- **Communications problems:**

Lack of Mutual Aid Channels - There were only two Mutual Aid channels available to public safety agencies, one for fire and one for police. The Fire Mutual Aid Radio System (FMARS) channel operated on 154.280 MHZ and was used for base-to-base, base-to-mobile, and mobile-to-mobile communications. The Police Mutual Aid Radio System (PMARS) channel operated half duplex on 458.550/453.550 MHZ, available for base-to-base communications through a manual patch at the communications center.

Interoperable communications during an incident like the Fourteenth Street Bridge disaster are conducted on the FMARS channel. The PMARS channel is used primarily for interjurisdictional vehicle pursuits and is spectrally inefficient in that it ties up three voice channels when in use.

Equipment Incompatibility and Channel Overloading - The communications problems agencies encountered during the Fourteenth Street Bridge rescue operation principally centered around an inability to utilize the mutual aid channels. This was generally caused by either radio incompatibility or severe overloading of the single available mutual aid channel. Some agencies did not have the capability to access the mutual channels at all because their radios operated outside the frequency band of the FMARS channel. Even those agencies that operated radios compatible with the mutual aid channel sometimes could not communicate effectively because the single mutual aid channel was severely overloaded. There is a peculiar irony in what has just been said. Some agencies could not access the already overloaded mutual aid channel. If these agencies were somehow able to access the mutual aid channel, the result would have been an even more overloaded mutual aid channel.

- **Specific Communications problems:**

Inadequately Informed Responders. Due to lack of early situation reports and congested radio communications channels, responders were not informed about what to expect, where to go, etc., as they responded to the scene.

Functional Contention on Channels. Fire/EMS personnel had to compete for airtime with traffic and routing communications that were being carried out on the only common channel.

Telephone Overload. A heavy increase in wireline telephone calls blocked wireline telephone circuits. This further complicated communications because the telephone was a primary link between communications centers due to the congestion of the single mutual aid channel.

Dispatcher Overload. Use of only a single mutual aid channel resulted in too much communications to a single dispatch point and resulted in overload. Lack of channels did not allow distribution of communications.

Manual Patching. Some responders with radios that operated in a frequency band incompatible with the mutual aid channel were required to patch through the dispatcher to communicate with others on the mutual aid channel. This is a highly undesirable solution because it is extremely cumbersome and ties up the channel that is patched to the mutual aid channel.

Helicopter Communications. The lone helicopter involved in the initial rescue operations was equipped with a synthesized aircraft radio capable of "dialing up" on other agencies frequencies. The hindrance to interoperability was not hardware based but administrative procedures. At the time many agencies did not want any "outside" agencies operating on their systems. Discussions in the Council of Governments Police Communications subcommittee following the Air Florida incident highlighted concerns over use of the FMARS channel and that helicopters operating in support of one jurisdiction on a medical evacuation were causing interference to ground units responding to other calls. The thrust of the discussions by some of the participants was that aero use of the FMARS channel be limited to ground use and in effect no airborne operation was authorized. It should be noted that much of the resistance has disappeared and there is now more interaction between helicopters and ground stations.

Hospital Communications. Due to inadequate radio communications, hospitals were not kept informed of the number of casualties that would be transported to them and their arrival times. Transporters were unsure of hospital capacities and therefore unsure of how to distribute transport of the casualties across the hospital network.

12.3.7 Methodologies to Meet Future Needs

12.3.7.1 Fire/EMS

Overview of Requirements and Methodologies

Fire and EMS resources are among the "front line" responders of all public safety agencies. Their communications needs, both for technology and for transmission of information, are critical.

As first responders to "all risk" incidents, they are often involved with multiple agencies, either responding or at scene.

Many of these agencies are dispatched by different command or dispatch centers across a wide range of frequencies and jurisdictional responsibility.

At times, these incidents are critical or catastrophic in nature, ranging from low-risk medical aids to vehicle and aircraft crashes, haz mat spills, and structural and wildland conflagrations.

Fire and rescue members are increasingly exposed to law enforcement activities with all of the attendant risks.

Efficient, concise and interoperable communications is the foundation for all fire and EMS operations, potentially determining whether human life and property is saved or lost.

Day-to-Day Interoperability Requirements

- takes place between personnel outside of their own jurisdictions (acting as reporting parties) and dispatchers, dispatchers to other dispatchers, dispatchers to responding field units of other agencies, and unit to unit.

- Available and adequate spectrum and radio systems dynamic enough to handle the entire range and complexity of the incident (or multiple incidents) are a necessity.

- Infrastructures have to be maintained and expanded, either on demand or as the result of population and workload.

- Available and adequate training is essential for all personnel dealing with day-to-day communications.

- The importance of "Automatic Aid" agreements must be understood by all participating parties. Automatic-aid agreements are one of the keys to successful operations. Resources from any agency may be dispatched automatically on the first alarm to any type of incident. The closest resource responds, be it federal, state or local.

- Automatic-aid agreements require preplanning, especially for communications interoperability; dispatch procedures, what frequency are we going to talk on, and who to contact at scene, all are very basic principles.

- It is absolutely essential that technology and spectrum be made available for Auto-aid resource dispatching and communications.

Mutual Aid Requirements

- Mutual aid occurs at two levels.

    - The first is comprised of long term, preplanned agreements, utilized on an occasional or seasonal basis, such as fire season in the Western states.

    - The second is the "cry for help" when everything is unraveling, and the Incident Commander, resources assigned or dispatch centers need additional resources, either in numbers or uniqueness of function.

- Preplanning of communications scenarios is essential. Jurisdictional program managers have the direct responsibility to talk to one another and play the "what if" game.

- Technology and available spectrum have to exist for mutual aid to actually perform as designed.

- Common interoperable frequencies must be assigned for the worst case scenario; the small county, perhaps out of state, local government resource responding to Oklahoma.

- A nationwide Mutual Aid Frequency plan should be mandated.

- This frequency concept already exists in the Aviation community; 121.500 MHZ and 243.00 MHZ were both used for declaring emergencies and communications with aircraft in distress.

<u>Task Force Requirements</u>

- Task force is group (typically five in the ICS) of like resources, usually with a leader, responding or assigned to a specific task.

- Fire task forces often are preplanned at local levels, their assignments triggered by auto or mutual aid agreements, or by escalating incident demands.

- Unit to unit communication within the Task Force and Task Force leader to next command level communications is essential.

<u>Conclusions and Recommendations</u>

- The basic responsibility of fire and EMS resources is to protect and serve the population.

- Through general awareness, consolidation and necessity, multi-jurisdictional participation in emergency incidents is becoming the norm rather than the exception.

- Without the ability to communicate, the fire and EMS mission is severely compromised, exposing all participants (civilian as well as responder) to loss of life and property.

- Interoperability must be self evident to all levels of governmental leaders; public safety communications needs should never become subordinate to any other sector.

- Additional dedicated VHF aircraft spectrum is needed for air-ground and air-air support of fire suppression missions.

12.3.7.2 Forestry Conservation

The Forestry-Conservation classification covers a broad range of operational tasks and requirements. These include:

- Forest Fire Detection and Suppression;

- Wildfire and Structure Arson Investigation and Enforcement;